DETAILED ACTION

1. The response filed on August 4, 2011 has been received.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 3, 5-9, and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Patil et al. in view of Murty (US 4,815,575).

Re-claims 1, 3, and 6 Patil et al. disclosed an active vehicle suspension system with fail-safe operation comprising: an actuator 100 with an armature and a stator, the stator having at least one coil with coil ends A, B, C, power electronics connected to the coil ends to deliver power to the actuator through the coil ends, and a fail-safe clamping circuit 118, 120, 138 connected to the coil ends powered by energy produced from the movement of the actuator that is directly conveyed to the clamping circuit from the coil ends, to passively damp the actuator during a failure of the power electronics by clamping the coil ends together through relay 120; wherein when the machine 104 is operated as an alternator in the fail-safe mode, electric currents are generated by the rotation of the armature via the screw threads 112 and the screw cage 106, and the generation of electric currents will definitely generate a back electromotive force which powers the clamping circuit through the coil assembly, see col. 4, lines 1-29.

However Patil et al. failed to disclose multiple coils and the clamping circuit electrically connects coil ends together to change the passive damping characteristic of the actuator and failed to disclose the clamping circuit comprises a solid-state device.

Murty teaches, as shown in fig. 2, the use of a multiple-phase coil assembly A,B,C, a MOSFET normally-open solid state switch 30, which is a silicon device, electrically connecting at least one coil end, see col. 3, lines 52-57.

It would have been obvious to one of ordinary skill in the art to merely provide the suspension system of Patil et al. with the known multiple-phase coil assembly which is a MOSFET normally-open solid-state switch and the switch electrically connecting at least one coil end, as taught by Murty, in order to change the passive damping characteristic of the actuator.

Re-claim 5 Patil et al. disclosed the clamping circuit comprising a rectifier 118 and a single unidirectional switch.

Re-claims 7 and 8, Patil et al. failed to disclose the use of a supplemental circuit, which comprises a bipolar Royer oscillator capable of operating at an input voltage of approximately 0.5 volts, for boosting the back EMF.

It would have been obvious to one of ordinary skill in the art to use a supplemental circuit to boost the voltage in order to enable the switch of the clamping circuit. As for the supplemental circuit comprises a bipolar Royer oscillator capable of operating at an input voltage of approximately 0.5 volts, it would have been obvious to one of ordinary skill in the art to use a bipolar Royer oscillator as merely a design choice as a selection of specific well known elements to perform a specific function.

Re-claim 9 Patil et al. was silent to disclose wherein the clamping circuit comprises switch circuitry enabled during vehicle startup and shutdown.

It would have been obvious to one of ordinary skill in the art to enabling the clamping circuit during vehicle startup and shutdown in order to ensure the generation of a force during a failure of the suspension device so as to provide safety.

Re-claim 11 Patil et al. failed to disclose wherein the clamping circuit comprises switch circuitry pulsed to change the passive damping characteristic of the actuator.

Murty teaches, as shown in fig. 2, wherein the output of the microcomputer 35 is a pulse modulated switching voltage which is provided to a switch 30 (part of the clamping switch) and thus control resistor 23 and the damping of the suspension, see col. 3, lines 52-57.

It would have been obvious to one of ordinary skill in the art to merely provide the suspension system of Patil et al. with the known use of the output of the microcomputer, a pulse modulated switching voltage, which is provided to a switch (part of the clamping switch) and thus control resistor and the damping of the suspension, as taught by Murty, in order to change the passive damping characteristic of the actuator so as to adjust the damping.

4. Claims 1, 3, and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Akami et al. (JP 2003-223220A) in view of Fig. 5 (JP 2003-223220A) or in view of Onishi (JP 03-243196).

Akami et al. disclosed an active vehicle suspension system with fail-safe operation comprising: an actuator 3 with an armature and a stator, the stator having at least one coil with coil ends, power electronics connected to the coil ends to deliver power to the actuator through the coil ends, and a fail-safe clamping circuit 49A comprising a solid-state device connected to the coil ends, and powered by energy produced from the movement of the actuator that is directly conveyed to the clamping circuit from the coil ends, to passively damp the actuator during a failure of the power electronics by clamping the coil ends together through relay; wherein when the machine is operated as an alternator in the fail-safe mode, wherein the movement of the actuator generates a back electromotive force as a result of the armature moving relative to the stator within the actuator see fig. 7 and par. [0052]-[0054].

However Akami et al. failed to disclose separating the clamping circuit from the power electronics.

Fig. 5 (JP 2003-223220A) teaches separating the clamping circuit from the power electronics, see par. [0027].

Onishi teaches an electrical actuator wherein coil ends are shortened based on energy (back electromotive force) produced from movement of the actuator, a clamping circuit, relay 3, is separated from the power electronics (motor driving amplification circuit 1).

It would have been obvious to one of ordinary skill in the art to provide the system of Akami et al. with the clamping circuit separate from the power electronics, as

taught by Fig. 5 (JP 2003-223220A) and Onishi, in order to provide the vehicle suspension system with a fail-safe operation.

Response to Arguments

5. Applicant's arguments filed on August 4, 2011 have been fully considered but they are not persuasive.

Patil et al. '284 and Murty '575 clearly teach the claimed limitations as outlined in the office action above. Applicant argued in the Remarks that the primary reference discloses mechanical relays, not solid-state switches. Note that Applicant's argument is more specific than the claim language.

Akami et al. (JP 2003-223220A) in view of Fig. 5 (JP 2003-223220A) or in view of Onishi (JP 03-243196) was disclosed by Office Action issued in Japanese application No. 2004-260804 dated July 25, 2011, see pages 2-3 of Examiner's Comments.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to MARIANO SY whose telephone number is (571)272-7126. The examiner can normally be reached on Mon.-Fri. from 8:30 A.M. to 2:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Siconolfi, can be reached on 571-272-7124. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://portal.uspto.gov/external/portal. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/MS/

October 13, 2011

/Robert A. Siconolfi/
Supervisory Patent Examiner, Art Unit 3657